UNITED STATES

DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

MAP AND TABLES DESCRIBING AREAS OF MINERAL RESOURCE POTENTIAL, SEWARD PENINSULA, ALASKA

78-1-C

(Text and tables to accompany Open-file Report 78-1-C)

by

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This report is preliminary and
has not been edited or reviewed
for conformity with Geological
Survey standards

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Contents

	Page
Introduction	1
Acknowledgments	3
Status of information	
Concepts and definitions	
Mineral resource potential areas	
Information about mineral resources potenial areas	
Grade and tonnage model data	
Summary and conclusions	
References	

Tables

Table 1. Reports prepared as a foundation for the mineral resource assessment of Seward Peninsula.

2. Mineral resource data for Seward Peninsula

3. Grade and tonnage models

INTRODUCTION

This report provides an assessment of the mineral endowment of Seward Peninsula, Alaska. It is based in large part on information compiled in a series of reports (table 1) prepared as a foundation for this study. The information in these reports is combined with other mineral resource data and used to identify geologic characteristics and controls of the distribution of mineral deposits, to outline areas of mineral resource potential, and to evaluate the significance of this potential in all possible cases. The evaluation of resource potential is quantitative and predictive of undiscovered resources for all areas that the data permit. For many areas, qualitative appraisals of potential, based on known or predicted resources, are made. For some areas, evaluations of resource potential cannot be made with the present information.

As used in this report, Seward Peninsula is that part of mainland northwestern Alaska that lies west of longitude 161° between Eschscholtz Bay to the north and Norton Bay to the south. Previous efforts to identify the mineral resources of this part of Alaska include studes by Lu, Heiner, and Harris (1968) and Sainsbury (1975). This study is a state-of-the-knowledge assessment of the mineral resource endowment of this part of Alaska but because our knowledge of Seward Peninsula mineral resources is incomplete, the report has some inherent limitations. To better understand the nature of these limitations as well as the strengths of the assessment it is necessary to clarify certain aspects of the available information and of the assessment process itself. These aspects are discussed further below.

The assessment has been guided throughout by one important rule--all extrapolations or interpretations of the data must be based on defined

Table 1.--Reports prepared as a foundation for the mineral resource assessment of Seward Peninsula

U.S. Geological Survey Open-file report numbers	Author(s)	Title
77-796A	Travis Hudson	Geologic map of Seward Peninsula, Alaska
77-796B	Travis Hudson, Martha L. Miller, and William J. Pickthorn	Map showing metalliferous and selected nonmetalliferous mineral deposits, Seward Peninsula, Alaska
77-796C	David F. Barnes and Travis Hudson	Bouguer gravity map of Seward Peninsula, Alaska
77-796D	C. L. Hummel	Map showing locations of exploration geochemical survey areas on Seward Peninsula, Alaska
77-796E	John Decker and Susan Karl	Preliminary aeromagnetic map of Seward Peninsula, Alaska
77-796F	John Decker and Susan Karl	Aeromagnetic profiles of Seward Peninsula, Alaska
77-796G	John W. Cady	Aeromagnetic interpretation map of Seward Peninsula, Alaska

geologic criteria. In order to present as much of the assessment criteria as possible, pertinent geologic and resource data are listed, along with evaluations of the resource potential of specific areas, in table 2. Some important conclusions concerning Seward Peninsula resource potential are summarized at the end of the report. Mineral resource assessment should be iterative, for as the geologic and mineral resource information base grows, successive assessments can be expected to be more conclusive, more specific, and more accurate. Because of this, this study should be considered a first-step in the comprehensive appraisal of Seward Peninsula mineral endowment.

ACKNOWLEDGEMENTS

Almost all of the data upon which this report is based were published by previous workers. Government geologists and mining engineers have done most of this work and many authors and their reports are cited individually in the report series that was prepared as a foundation for this study (table 1). Some reports have provided information in the final stages of this study and they are included in the list of references at the end of this report although they have not been cited specifically within it. Recent resource studies on Seward Peninsula have largely been undertaken by industry geologists. These gelogists have been consulted and without exception have been cooperative and helpful in providing new information on the distribution and controls of Seward Peninsula mineral deposits. Because of the time limitation of this study, it could not have been completed without the technical assistance provided by Beth Abramson, Shirley Kelmenson, and William J. Pickthorn.

STATUS OF INFORMATION

Information about Seward Peninsula mineral deposits has accumulated

since 1899 following the discovery of gold in the Nome area. This information has some inherent limitations for resource assessment that stem from: (1) the limited scope of most geologic studies throughout the history of Seward Peninsula exploration, (2) the restricting influence of the natural environment on the level of understanding developed by Seward Peninsula geologic studies, and (3) the effect of new data and concepts that postdate most of Seward Peninsula geologic studies.

Compared to other parts of Alaska, Seward Peninsula has received considerable scientific effort focused on regional geology and mineral deposit problems but detailed, modern studies of mineralized areas have only been completed in the Lost River area. Knowledge of the structure, age, and distribution of regional bedrock units is incomplete and controls to the distribution of mineral deposits are only known in a general way for most deposits. Furthermore, the level of information differs considerably from one area to another--in large part due to the limited scope of early studies. The early studies mostly reported on mining activities and almost all mining on Seward Peninsula has been for placer gold. Some areas of placer gold mining contain other types of deposits and many of these other depostis were identified early in the history of Seward Peninsula exploration. However, regions that do not contain placer gold deposits have, in many cases, not received even the subsidiary-type exploration that accompanied the development of gold-bearing regions. Taken as a whole, Seward Peninsula studies have been biased towards areas of known placer gold deposits. Thus large parts of Seward Peninsula are essentially unexplored for mineral deposits. Evidence of this has been provided by recent industry exploration. Within the last three years, private interests have identified several previously unknown mineralized zones within little explored areas--areas containing few or no

known placer gold deposits.

The natural environment of Seward Peninsula has created some imposing handicaps to geologic studies and mineral deposit exploration. Seward Peninsula is characterized by a periglacial environment and extensive regions of permafrost. Frost action has played an important part in development of the present topography and outcrop patterns; large areas contain only local outcrop of bedrock units. These areas are mantled by thick accumulations of frost-riven rubble that are commonly frozen and covered by a nearly continuous blanket of tundra. Tundra and rubble cover are very serious handicaps to understanding the geology of the peninsula. Wherever bedrock units cannot be observed in outcrop, geologic studies, regardless of the time and effort expended, will continually be hampered and less conclusive than desired. This is the case over large parts of northern, eastern, and southern Seward Peninsula. Only highlands such as the York, Kigluaik, Bendeleben, and Darby Mountains provide natural conditions of bedrock exposure necessary to more conclusive geologic studies, but even these regions have local areas of poor bedrock exposure. The natural environment of Seward Peninsula thus insures that most geologic studies require more extensive application of geochemical, geophysical and other techniques (drilling or trenching) than has been realistically available and a higher level of interpretation than is desired. The direct implication of this naturally imposed condition is that the majority of Seward Peninsula geologic studies, reconnaissance in scope, provide only general understanding of this geologically complex region.

Since about 1972, almost all mineral deposit studies on Seward Peninsula have been initiated by private industry. The principal effect of these studies on resource assessment is that new mineralized zones have been discovered and more importantly, that new types of deposits have been

identified for the region. The identification of new deposit types is exceptionally important to resource assessment and can cause major changes in the identified resource potential of an area. New deposit types are identified by discovery during exploration or by examination of known deposits of uncertain type. In either case, identification of a new deposit type leads to immediate shifts in the understanding of the geologic data. Important resource assessment parameters such as deposit size, grade, potential by-products, and geologic controls immediately change or become clearer upon recognition of new deposit types in an area. Within the last three years, industry exploration on Seward Peninsula has identified two new deposit types; the first by discovery of contact-metamorphic iron-copper deposits and the second by classification of certain lead-zinc deposits as stratiform in nature. These new data and concepts, although preliminary, have dictated important new considerations of the geology and resource potential of large parts of Seward Peninsula. The accompanying map showing areas of resource potential would have been considerably different in some details if this study had been done five years ago. The recent recognition of new Seward Peninsula deposit types emphasizes the time-dependent nature of this study. As our knowledge of Seward Peninsula mineral endowment continues to develop, important changes in the definitiveness and accuracy of resource assessments are to be expected.

CONCEPTS AND DEFINITIONS

This assessment includes an inventory of known deposits and estimates of undiscovered resources. In order to base the assessment as soundly as possible on the known geology, the following four-step approach has been taken:

(1) Data on all known deposits were used to define deposit types present on Seward Peninsula.

(2) Geologic controls or characteristics of the different deposit types and their representative geologic environments were identified to the extent possible.

(3) All the data compiled in steps (1) and (2) were used to define areas with potential for specific deposit types. These areas either contain known deposits of the specified type or show evidence that the geologic controls or characteristics of the deposit type are present.

(4) An inventory of the number of known and predicted deposits of the specified type within each area was made in all cases permitted by the data. This inventory was based on defined geologic criteria and completed for different levels of certainty (see explanation of column 9, table 2, p 13). For those areas where the data are inadequate for such predictions, a qualitative appraisal of the resource potential was made. Many areas can be shown to have potential for mineral resources but this potential cannot be evaluated with present information.

This approach to mineral resource assessment relies heavily on knowledge of the geology. Thus, a more confident assessment was made in those cases where all deposit types and geologic controls are known with assurance. Because the main objective of the assessment is to determine the number of deposits of a particular type within a particular area, it provides an estimate of resource abundance only in those cases where the tonnage-grade characteritics of the deposit type are known. For most Seward Peninsula deposit types, representative tonnage-grade data are not known and the estimates of deposit number must therefore stand alone as the only quantitative measure of resource potential.

This report uses many terms whose meanings are subject to interpretation. Resource terminology used by the U.S. Geological Survey and U.S. Bureau of Mines has been summarized in a recent publication (U.S. Bur. Mines and U.S. Geol. Survey, 1976) and Schanz (1975) has presented a comprehensive summary of problems in mineral resource terminology. The following definitions are presented in order to

clarify how certain terms have been used in this study.

Resource- A resource is a useful commodity contained in mineral deposits. Seward Peninsula resources are dominantly metallic elements but also include the nonmetallic commodities graphite, fluorite, barite, and mica. Coal, oil, natural gas, and geothermal resources have not been included in the study.

Deposit- A deposit is any natural concentration of useful minerals. A concentration of useful minerals does not have to be economically recoverable at present in order to be a deposit.

Deposit type- A deposit type is a category of mineral deposits that have common geologic, mineralogic, and occurrence characteristics. Deposits within a type do not necessarily share a common origin and age although many do.

Indicator- An indicator is a geological, geophysical, or geochemical characteristic that is commonly associated with a specific deposit type. The presence of an indicator suggests the presence of a deposit. For example, placer god deposits are an indicator for lode gold deposits, certain aeromagnetic anomalies are indicators for magnetite deposits, and certain biotite-granite plutons are indicators for tin deposits. A deposit whose presence is suggested by the presence of an indicator is an "indicated" deposit.

Geologic controls- Geologic controls are the set of characteristics that define the geologic setting of a deposit type. Geologic controls are well known for a few Seward Peninsula deposit types, generally known for some others, and poorly known for many.

Permissible- Areas are permissibile for the occurrence of a deposit of a specified type if they have not been comprehensively explored and satisfy one or both of the following criteria: (1) they contain specific indicators for the deposit type such as characteristic alteration, geochemical anomalies, or related types of mineralization; or (2) they contain geologic units, relations, or environments (geologic controls) similar to those known to be associated with the deposit type elsewhere.

Mineral resource potential area- Mineral resource potential areas are those areas that contain known mineral deposits or are

permissible for the occurrence of specific deposit types (see discussion below).

Mineral endowment- Mineral endowment refers to the entire mineral wealth of a region--independent of economic considerations and including all the resources contained in deposits of known or unknown type.

MINERAL RESOURCE POTENTIAL AREAS

Mineral resource potential areas either contain known deposits or are geologiclly permissible for deposits of a specified type. Areas satisfying one or both of these criteria have been identified on the accompanying map. The mapped areas are not equivalent in potential for mineral resources and some have been delineated on the basis of meager information. The data used to define specific resource potential areas and the data available to determine the relative potential of one area compared to another are summarized in table 2.

As information concerning either the geology of a specific area or of a specific deposit type increases, the defined areas of resource potential become smaller and better defined. With comprehensive knowledge of the deposit types and the geology of Seward Peninsula, the resource potential areas could be expected to shrink towards sizes that would, in many cases, show as spots (individual deposits or closely spaced groups of deposits) at the scale of the accompanying map. Areas of dense spots would, of course, define larger areas of potential but even these would probably be much smaller in actual size than those that can now be delineated.

There are some parts of Seward Peninsula that are not delineated as mineral resource potential areas. For the most part, these areas lack the geologic relations that are associated with known or suspected

Seward Peninsula deposit types. They contain only a few scattered small deposits or occurrences and commonly are regions of extensive surficial, sedimentary, or volcanic cover. Regions of extensive surficial, sedimentary, or volcanic cover may contain mineral deposits in bedrock units at depth but chances for discovery and exploitation of such deposits are minimal.

Information About Mineral Resource Potential Areas

Table 2 includes compilations and summaries of geologic and mineral resource information as well as qualitative or quantitative estimates of mineral resource potential. The geologic and mineral resource information has been abbreviated for tabular presentation and is intended to identify the basis for determining the resource potential of delineated areas. The table includes ten columns, and these are discussed separately below:

1. Area outlined on map - The number in this column refers to a numbered mineral resource potential area (hereafter referred to as the "area") on the map.

2. Types of known mineral deposits - The types of identified mineral deposits within the area are listed in this column. The mineral deposit types are identified by a lower case letter for reference in other columns. The principal resources and minor resources (in parentheses) are indicated by name or standard chemical symbols. A descriptive word or phrase identifies the deposit type.

3. Types of suspected or speculative mineral deposits - The types of mineral deposits for which the area is permissible because of its geology and exploration history are listed in this column. The different types of suspected or speculative mineral deposits are identified by successive letters following those used for types of known mineral deposits (column 2). Principal resources and minor resources (in parentheses) are indicated by name or standard chemical symbols. A descriptive word or phrase identifies the deposit type.

4. Geologic control(s) of mineral resources - Brief statements describing the general geologic characteristics of the area, the types of known, suspected, or speculative mineral deposits in the area (referenced by letter to columns 2 and 3), and, if possible, the relationship of the deposit types to the geology of the area are presented in this column.

5. Production and resource information - Available production data and estimates of identified resources for the deposit types listed in columns 2 and 3 are summarized for the area in this column. Placer gold and silver production was estimated from the data compiled by Lu, Heiner, and Harris (1968, p. 18-31).

6. Status of Geologic information - The status and scale of geologic mapping, geochemical surveys, geophysical surveys, mineral deposit studies and recent industry exploration or mining activity in the area are summarized in this column.

7. Additional comments - Comments in this column are intended to further clarify the general geologic control(s) of mineral resources (column 4) for the area. Mostly these comments indicate the geologic criteria by which the area is considered permissible for the occurrence of mineral deposits of a specified type.

8. Summary of mineral resource potential - Qualitative statements about the overall mineral resource potential of the area and about the occurrence potential of specific deposit types in the area (referenced by letter to columns 2 and 3) are presented in this column.

9. Estimated number of deposits (percent chance that there are the number presented or more) - Quantitative estimates, if appropriate, of the number of deposits of specific type (referenced by letter to columns 2 an 3) that may exist within the area are presented in this column. These estimates are a prediction of the number of deposits within the area at high (90 percent), medium (50 percent), and low (10 percent) levels of certainty. In table 2, this information resembles a fraction; the level of certainty is the "numerator" and the estimated number of deposits is the "denominator". As used here, level of certainty is the percent chance (probability) that the estimated number, or more, of the deposits occur in the area. Estimates of the number of deposits of a specified type within the area are assigened levels of certainty according to the following criteria:

(a) The number of identified deposits (based on the distribution of known deposits) is assigned to a 90 percent level of certainty.

(b) The number of indicated deposits (based on the occurrence of geological, geophysical, or geochemical characteristics that are commonly associated with the deposit type) plus the number of identified deposits is assigned a 50 percent level of certainty.

(c) The number of predicted deposits (based on comparison with other areas or extrapolation of deposit density and geologic control(s) within the area) plus the number of indicated deposits plus the number of identified deposits is assigned a 10 percent level of certainty.

10. Grade and tonnage models for deposit types - The expected size of mineral deposits of a specified type (referenced by letter to columns 2 and 3) is indicated in this column by reference to a grade-tonnage model in table 3, if possible. On the basis of available information, most Seward Peninsula mineral deposits cannot be shown to be part of the populations represented by the grade-tonnage models of table 3, which have been developed based upon grade and tonnage data from mineral deposits elsewhere in the world. The estimates of numbers of deposits given in column 9 and the grade-tonnage estimates of column 10 may be used to construct point or interval estimates of resource potential for the area using methodologies similar to those described by Harris, Freyman, and Barry (1970). The absence of information in columns 9 or 10 indicates that these methods of estimating resource potential cannot be used at present.

Table 2. Mineral resource data for Seward Peninsula

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
1.	a. Sn(W) - vein, stockwork, greisen, tactite, placer b. Pb,Ag,(Zn) - vein and replacement c. Be,CaF_2 - vein and replacement d. U - secondary and hydrothermal e. Au - placer	f. Au - vein or disseminated lode	Area contains low-grade carbonaceous metasedimentary rocks, metavolcanic rocks, limestone, and marble intruded locally by epizonal biotite granite stocks. Granite stocks are spatially related to Sn,W,Pb, Zn,Ag,Be,CaF_2, and U mineralization. Placer gold deposits occur in some areas of low-grade carbonaceous metasedimentary rocks. a. Cassiterite- and, locally, wolframite-bearing lodes in or adjacent to granite stocks. Base-metal sulfides commonly present. b. Galena-, sphalerite-, and silver-bearing veins or replacement bodies commonly peripheral to areas of tin mineralization. c. Beryllium-bearing fluorite deposits in carbonate rocks peripheral to tin-tungsten-sulfide mineralization in the Lost River area. d. Secondary uranium-bearing minerals in porous zones or fractures in granite and uranium-bearing hydrothermally altered zones in granite.	a. Total tin production from placer deposits has been more than 1680 metric tons; 60% was from the Potato Mountain area and 35% was from the Cape Mountain area. During WWII USBM estimated 300 metric tons of tin in 530,000 m^3 of gravel in Cape Mountain area and 170 metric tons of tin in 880,000 m^3 of gravel in Potato Mountain area. Total tin production from lode deposits has been more than 330 metric tons, 6 from the Bartell mine at Cape Mountain and the remainder from the Lost River mine. In 1963, lode tin resources in the Lost River area were estimated at 4 to 11 million metric tons of material containing 33,000 metric tons of tin. Based on new drilling data in some parts of the Lost River deposits, 96,000 metric tons of material contain an estimated 0.48% tungsten and an additional 590,000 metric tons of material contain 0.16% tungsten.	Geologic mapping at 1:250,000 complete. Several detailed studies of mineralized areas by industry and government including extensive drilling in the Lost River area. Recent exploration by industry for Sn,W, Be,CaF_2, and U desposits.	Principal mineralization related to a belt of widely separated epizonal biotite granite stocks. Similar stocks are inferred at depth in the Potato and Kougarok Mountain areas. Other buried plutons probably present.	Area contains important resources of tin, beryllium, fluorite and tungsten. Lead, zinc, silver, and gold resources are also present. a. About 40% of identified U.S. tin resources are located in this area. One principal mineralized zone is identified but many additional deposits are present or strongly indicated. Tin resources are probably at least several times those already known. b. Several deposits identified in areas of tin mineralization. Additional deposits probably present. c. Seven mineralized zones have been identified in the Lost River area. Some additional deposits are probably present in this area and a few deposits may be present in other areas.	a. 90/10 50/23 10/31 b. 90/7 50/17 10/21 c. 90/7 50/12 10/15	a. - b. - c. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
1. (con't.)			e. Gold, locally with cassiterite, disseminated in stream gravels of a few areas; local bedrock is dominantly carbonaceous metasedimentary rock. f. Lode sources of placer gold have not been identified. Some residual gold placers over sulfide-bearing schist may indicate presence of disseminated lode gold deposits similar to those in areas 23 and 26.	b. Prior to 1918, the Alaska Chief and Bessie-Maple lodes were prospected with assay values reported for lead, zinc, tin, silver, copper, tungsten, and antimony. A 3 m intersection of a diamond drill hole on the Bessie-Maple lode graded 0.18% tin, 0.11% lead, 4.9% zinc, 0.15% copper, and 46 g/t silver. c. Beryllium-fluorite resources in Lost River area were estimated in 1964 to be 1.8 million metric tons of material containing 0.18 to 0.20% beryllium and 50% fluorite with additional material at lower grades. In addition to fluorite in tin deposits (see a above), another identified mineralized zone contains 3.5 million metric tons at 30.33% fluorite. d. At Brooks Mountain, a 4.3 m by 1.2 m lens in altered granite contains 0.1 to 0.2% eU and local fractures contain 0.05% eU. Some samples to 2.1% eU and			d. Three known uraniferous zones in granite. Several additional zones probably present but significance cannot be evaluated with present information. e. Gold placers known in four widely separated areas. Principal deposits probably identified but not exhausted. f. Residual placers identify two bedrock mineralized zones. Additional deposits probably present in source areas of placer deposits.	d. 90/3 50/8 10/12 e. n.a. f. 90/2 50/5 10/7	d. - e. - f. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSI TYPES (DATA LISTE IN TABLE 3)
1. (con't.)				the unaltered granite averages 0.005% eU. Thirty-three samples of granite from the Serpentine Hot Springs area have been analyzed for U and Th (in ppm): Mean / Range U 16.4 5.0-63.7 Th 51.4 28.8-83.7 Th/U 5.1 0.5-11.2 e. Placer production: almost all of the 23 kg of gold and 2.3 kg of silver recorded for the Serpentine district and less than 5% of the 1540 kg of gold and 68 kg of silver recorded for the Port Clarence district was produced from this area. f. No known deposits.					

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
2.	a. Cu - tabular replacement bodies b. Au - placer	c. Pb,Zn - stratiform d. Au - vein or disseminated lode	Area of low-grade metasedimentary and metavolcanic rocks including a northwest-trending belt of marble. a. Copper-carbonate- and copper-sulfide-bearing zones at schist-marble contacts. b. One area has produced gold from placer deposits in stream gravels. c. No known deposits of this type but presence of marble belt requires that area be considered permissible for their occurrence (see Additional Comments). d. Gold-bearing veinlets have been identified at two localities but lode sources of placer gold deposits have not been identified.	a. About 40 metric tons of 37% copper ore were shipped from the Ward mine between 1906 and 1916. Assays ranged from 51.33% copper across 20 cm to 10% copper across 3 m. b. Placer production: Less than 5% of the 1540 kg of gold and 68 kg of silver recorded for the Port Clarence district was produced in this area. c. No known deposits. d. No data.	Geologic mapping at 1:250,000 complete. Reconnaissance geochemical survey in the Kougarok Mountain area.	Tin mineralization and an inferred buried granite pluton are present in the part of the area that overlaps with area 1. Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contacts with marble--some galena concentrations are present locally.	Area contains some gold and copper resources. Zinc and lead resources may or may not be present. Potential for tin and related mineralization included with area 1. a. Three apparently small deposits identified. Additional deposits may be present. b. Placer gold mining in two different areas. Probably few additional deposits. c. No known deposits. Potential cannot be evaluated with present information. d. Two small vein deposits at localities not associated with placer deposits. At least four lode gold deposits are probably present.	a. n.a. b. n.a. c. n.a. d. $\frac{90}{2}$ $\frac{50}{4}$ $\frac{10}{5}$	a. - b. - c. - d. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
3.	a. Au - placer	b. Au - vein or disseminated lode	Area of low-grade carbonaceous metasedimentary rocks and metavolcanic rocks. a. Many placer gold deposits in stream gravels. b. Nature of lode sources of placer gold not identified (see Additional Comments).	a. Along with area 4, this area accounted for most of the 6872 kg of gold and 300 kg of silver recorded from the Kougarok district, especially from operations along the Kougarok River. All production from placer deposits. b. No data.	Reconnaissance geologic mapping at 1:250,000 complete. Aeromagnetic survey and interpretation for most of the area. Active placer mining locally.	Residual placer gold deposits are present. Lack of identified large gold-bearing veins suggests that principal lode gold deposits are of disseminated type and possibly similar to those present in areas 23 and 26.	Area contains important gold resources. a. Many placer gold deposits in at least seven separate drainage systems. Principal deposits probably identified but not exhausted. b. One identified lode deposit. Additional deposits probably present in source areas of placer gold deposits.	a. n.a b. $\frac{90}{1}$ $\frac{50}{7}$ $\frac{10}{9}$	a. - b. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
4.	a. Au -placer b. Cu -tabular replacement bodies	c. Pb,Zn -stratiform d. Au -vein or disseminated lode	Area of low-grade carbonaceous metasedimentary rocks, metavolcanic rocks, and a northerly-trending belt of marble. a. Many placer gold deposits in stream gravels. b. Copper-carbonates and sparse copper-sulfides in silicified limestone. c. No known deposits of this type but presence of marble belt requires that the area be considered permissible for their occurrence (see Additional Comments). d. Nature of lode sources of placer gold not identified (see Additional Comments).	a. Placer production: Along with Area 3, this area accounted for most of the 6872 kg of gold and 300 kg of silver recorded from the Kougarok district, especially from operations along the Kougarok River. b. No data. c. No known deposits. d. No known deposits.	Reconnaissance geologic mapping at 1:250,000 complete. Aeromagnetic survey and interpretation for part of the area.	Known stratiform lead-zinc deposits on Seward Peninsula (area 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contacts with marble--some galena concentrations are present locally. Lack of identified large gold-bearing veins suggests that principal lode gold deposits are of disseminated type and possibly similar to those present in areas 23 and 26.	Area probably contains important gold resources. a. Many placer gold deposits including some along parts of Kougarok River. Principal deposits probably identified but not exhausted. Additional deposits may be present in areas of deep bedrock. b. Two apparently small lodes identified. Additional deposits probably present but significance cannot be determined with present information. c. No known deposits. Potential cannot be evaluated with present information. d. No known deposits but several deposits are probably present in source areas of placer gold.	a. n.a. b. n.a. c. n.a. d. $\frac{90}{1}$ $\frac{50}{5}$ $\frac{10}{10}$	a. - b. - c. - d. -

REA UTLINED N MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
.		a. Pb,Zn -stratiform	Area of low-grade metasedimentary rocks including a northerly trending belt of marble. a. No known deposits of this type but presence of marble belt requires that area be considered permissible for their occurrence (see Additional Comments).	a. No known deposits.	Reconnaissance geologic mapping at 1:250,000 complete.	Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contact with marble—some galena concentrations are present locally.	a. No known deposits. Potential cannot be evaluated with present information.	a. n.a.	a. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
6.	a. Au -placer b. Pb,Zn -stratiform	c. Au(W,Ag)-vein or disseminated lode d. Sn(W) -vein, stockwork, greisen, tactite or placer e. Pb,Ag(Zn)-vein or replacement f. U -secondary and hydrothermal in granite	Structurally complex area of low-grade carbonaceous metasedimentary rocks, metavolcanic rocks, and carbonate rocks - intruded locally by biotite granite. a. Many placer gold deposits in stream gravels. Some mining in old stream channels buried by basalt flows. b. Disseminated sphalerite and less abundant galena in silicified schist at contact with marble. Dolomitized marble and galena concentrations present locally. c. Nature of lode sources of placer gold not identified (see Additional Comments). d. Detrital cassiterite present in some heavy mineral concentrates from stream gravels. Lode tin deposits may be associated with biotite granite of the area. e. Presence of lead-zinc geochemical anomalies and ferruginous gossans could reflect vein or replacement lead-silver deposits rather than stratiform lead-zinc deposits.	a. Placer production: An undetermined amount of the 16,389 kg of gold and 893 kg of silver recorded for the Fairhaven district was produced from this area. b. An assay sample over a width of 0.5 m at Harrys Creek, including a 5 to 8-cm galena vein, contained 10% lead, 2.2% zinc, and 60 g/t silver. At Hannum Creek, a grab sample over a 2-m distance in mineralized marble contained 0.12% lead and 0.38% zinc. USBM work in 1956, 59, and 63 identified a mineralized zone 100-200 meters wide and over 1200 meters long; three samples of oxidized material contained an average of 0.73% lead, 38 g/t silver, and a trace of gold. c. No data. d. No known deposits. e. Samples of ferruginous gossan at two localities contain as much as 500 ppm copper, lead, and zinc, 1.4 g/t gold, and 8.2 g/t silver. f. No known deposits.	Reconnaissance geologic mapping at 1:250,000 complete. Some 1:63,360 geologic mapping. Larger scale detailed studies of some mineralized areas. Reconnaissance geochemical survey of most of area. Active placer gold mining locally.	Geology poorly understood. Presence of detrital cassiterite indicates potential for both tin and related mineralization such as Pb, Ag, W, and U (see area 1). Lack of identified large gold-bearing veins combined with known occurrence of gold-,silver, and sulfide-bearing schist suggests that principal lode gold deposits are of disseminated type and possibly similar to those present in areas 23 and 26.	Area contains important resources of lead, zinc, silver, and gold. Potential for tin, tungsten, and uranium deposits cannot be evaluated. a. Inmachuck River and two tributary systems contain principal placer deposits. Known deposits extensively mined but not exhausted. Additional deposits probably present in areas of deep bedrock, in older stream channels, and possibly in smaller drainages. b. One identified area of stratiform lead-zinc mineralization. Additional deposits may be present. c. One identified deposit of probable disseminated type and three others of unknown type. Additional deposits probably present in source areas of placer gold.	a. n.a. b. n.a. c. $\frac{90}{1}$ $\frac{50}{4}$ $\frac{10}{8}$	a. - b. - c. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
6. (con't.)			f. Biotite granite in the area is possible host for secondary and hydrothermal uranium deposits.				d. No known deposits but detrital cassiterite is present in three drainages; lode sources are probably present.	d. n.a.	d. -
							e. No known deposits. Potential cannot be evaluated with present information.	e. n.a.	e. -
							f. No known deposits. Potential cannot be evaluated with present information.	f. n.a.	f. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
7.	a. Pb,Ag(Zn)-vein or replacement b. Au -placer	c. Pb,Zn -stratiform d. Au -vein or disseminated lodes e. Cu -tactite or skarn	Large terrane of metasedimentary and metavolcanic rocks including many areas of limestone and marble. Intruded locally by granitic plutons. Bedrock geology covered in places by upper Cenozoic basalt flows. a. Argentiferous galena and less abundant sphalerite in shear zones or veins. b. Scattered occurrences of placer gold in stream gravels. c. No known deposits of this type but presence of carbonate units requires that area be considered permissible for their occurrence(see Additional Comments). d. Nature of lode sources of placer gold not identified. e. No known deposits but copper-bearing zones adjacent to granitic plutons, possibly similar to those in area 8, may be present.	a. Two shipments of ore from the Independence Mine (Kugruk Galena Mine) in 1921-22 totaled about 32 metric tons of ore containing 30.1% lead, 4.9% zinc, and 1130 g/t silver. A 1944 examination described 5 ore bodies on two levels totaling perhaps 660 metric tons of ore per vertical meter averaging 6.4% lead and 290 g/t silver. Mineralization extends for more than 1500 m along strike. b. Placer production: A small amount of the recorded production of the Fairhaven (16839 kg gold, 893 kg silver) and the Koyuk (2478 kg gold, 85 kg silver) districts was produced from streams in this area. Glacier Creek may have produced about 200 kg of gold. c. No known deposits. d. No known deposits. e. No known deposits.	Reconnaissance geologic mapping at 1:250,000 over most of area. Active exploration by industry for base-metals. Area poorly exposed and poorly known.	Area primarily defined by presence of carbonate and other metasedimentary rocks locally extended from area 6. Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contact with marble - - some galena concentrations present locally.	Area probably contains important resources of lead, zinc, and silver. a. Three known mineralized zones. Geochemical anomalies recently identified by industry at eight other localities. Additional deposits probably present. b. Four widely separated areas of placer deposits. Additional deposits could be present in old stream channels buried by basalt flows or in other areas. c. No known deposits. Recently identified geochemical anomalies in central part of area could be related to this type of deposit. Potential cannot be evaluated with present information. d. No known deposits. Source regions for four placer gold areas probably contain lode deposits. Other areas of deposits may be present.	a. 90 50 10 / 3 11 ? b. n.a. c. n.a. d. n.a.	a. - b. - c. - d. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
7. (con't.)							e. No known deposits. Potential cannot be evaluated with present information.	e. n.a.	e. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
3.	a. Fe,Cu - contact-metamorphic b. Au - placer	c. U - unknown type d. Pb,Ag(Zn) - vein or replacement e. Pb,Zn -stratiform f. Au -vein or disseminated lode	Area of metasedimentary rocks including marble intruded locally by granitic plutons. Some coal-bearing sedimentary rocks are present. a. Dolomite-cemented magnetite breccia with pyrite-chalcopyrite veinlets--peripheral to granitic pluton. b. Scattered placer gold deposits in stream and, locally, beach gravel. c. Mineral claims for uranium have been recorded (see Additional Comments). d. No known deposits of this type but they are present nearby in areas 7 and 9. e. No known deposits of this type but presence of marble units requires that area be considered permissible for their occurrence (see Additional Comments). f. Nature of lode sources of placer gold not identified (see Additional Comments).	a. Massive magnetite with less than 1% copper identified by 1977 drilling. Float of similar mineralization identified in contact- metamorphic zones elsewhere in area. b. Reports on production from deposits in the Kugruk River indicate that 100-300 kg of gold may have been produced. c. Samples from claims in central part of area contain $\leq$ 0.01% cu. One sample from the Kugruk pluton contains 7.3 ppm U and 36.2 ppm Th. d. No known deposits. e. No known deposits. f. No known deposits.	Reconnaissance geologic mapping at 1:250,000 for most of area but area is poorly exposed and poorly known. Active industry exploration for iron, base-metal, and uranium deposits.	Magnetite-chalcopyrite deposits only recently discovered. Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contact with marble-- some galena concentrations are present locally. Significance of claims for uranium in central part of area not substantiated by subsequent exploration. Lack of identified large gold-bearing veins suggest that principal lode gold deposits are of disseminated type and possibly similar to those present in areas 23 and 26.	Area contains resources of iron, copper, and gold. Lead, zinc, and silver resources may be present. a. One identified large deposit. Nature and distribution of aeromagnetic anomalies indicates that several additional deposits are probably present. b. Placer gold deposits in three widely separated areas. Potential for additional deposits cannot be evaluated with present information. c. Two isolated occurrences without apparent significance and one recently claimed area. Potential cannot be evaluated with present information.	a. $\frac{90}{1}$ $\frac{50}{3}$ $\frac{10}{7}$ b. n.a. c. n.a.	a. - b. - c. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
8. (con't.)							d. No known deposits but presence of these deposits in adjacent areas of apparently similar geology indicates that they may be present.	d. n.a.	d. -
							e. No known deposits. Potential cannot be evaluated with present information.	e. n.a.	e. -
							f. No known deposits; source areas of placer gold may contain lode deposits.	f. n.a.	f. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
9.	a. Au -placer b. Pb,Ag -vein or replacement	c. Au -vein or disseminated lode d. Pb,Zn -stratiform	Area of carbonaceous metasedimentary rocks and marble. a. Many placer gold deposits in stream gravels. b. Some argentiferous galena veins reported in bedrock of placer mined areas. c. Nature of lode sources of placer gold not identified (see Additional Comments). d. No known deposits but presence of marble units requires that area be considered permissible for their occurrence (see Additional Comments).	a. Placer production: The majority of the 16389 kg of gold and 893 kg of silver recorded from the Fairhaven district was produced from this area. b. Several veins ranging from 0.2 to 1 m wide explored by a shaft before 1947. c. No known deposits. d. No known deposits.	Reconnaissance geologic mapping at 1:250,000 only. Poorly exposed and poorly known. Active placer gold mining.	Lack of identified large gold-bearing veins suggests that principal lode gold deposits are of disseminated type and possibly similar to those in areas 23 and 26. Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contact with marble--some galena concentrations are present locally.	Area contains important resources of gold. Lead, silver, and possibly zinc resources are present. a. Major placer gold production. Three separate drainages with important deposits. Principal deposits extensively mined but not exhausted. Additional deposits may be present in areas of deep bedrock. b. Deposits known in two areas; additional deposits probably present. c. No known deposits but some are probably present in source areas of placer gold. d. No known deposits. Potential cannot be evaluated with present information.	a. n.a. b. n.a. c. n.a. d. n.a.	a. - b. - c. - d. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
10.	a. U(Th) - disseminated and hydrothermal lode	--	Area defined by outcrop of a northerly trending belt of alkalic and related plutonic rocks known to be associated with lode uranium deposits. Plutons intrude metavolcanic rocks. a. Uranium-bearing accessory minerals in plutonic rocks (disseminated type) and uranium- and sulfide-bearing hydrothermally altered zones associated with plutonic rocks. Sulfide-bearing zones also contain Mo,Bi, Pb,Cu, and Ag.	a. Five samples of the Granite Mountain pluton have been analyzed for U and Th (in ppm): Mean / Range U 8.2 / 4.2-16.4 Th 30.8 / 10.8-58.1 Th/U 3.85 / 2.05-5.12	Reconnaissance geologic mapping at 1:250,000 complete. Some detailed studies by industry and government in known mineralized areas. Reconnaissance heavy mineral survey over most of area. Active exploration by industry for uranium.	Area is known uraniferous terrane and has received much industry effort in recent years.	Area contains at least some resources of uranium. a. Recent government-sponsored survey has identified at least one hydrothermally altered, uranium-bearing zone. Uranium-bearing minerals have been identified in drainages of four general areas. Additional uranium-bearing lode deposits are probably present.	a. 90 / 1 50 / 5 10 / 9	a. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATE LISTED IN TABLE 3)
11.	a. Pb,Zn,Ag - vein or replacement b. W -vein c. Au(Pt,U) - placer	d. Au -vein or disseminated lode	Area of altered and mineralized rocks in and adjacent to granitic pluton. Pluton intrudes metavolcanic rocks. a. Sulfide-bearing altered zones adjacent to granitic pluton. b. Quartz vein with tourmaline and scheelite in country rocks adjacent to granitic pluton. c. Gold, with some platinum-group metals and uranium-bearing minerals, disseminated locally in stream gravels. d. Nature of lode sources of placer gold not identified.	a. A composite grab sample from a 15 m long outcrop contains more than 2% lead and about 5% zinc and 44 g/t silver. b. A grab sample of scheelite-bearing vein material contains more than 1% tungsten. c. No data. d. No known deposits.	Reconnaissance geologic mapping at 1:63,360 and stream sediment geochemical survey complete. Recent geologic mapping, geochemical and geophysical surveys, and drilling by industry. Area under active exploration.	Area of poor exposure - extent and nature of mineralization not well known.	Area contains resources of lead, zinc, silver, and possibly tungsten. a. One large zone with complex sulfide mineralization identified. Nature and extent of sulfide-rich zones within larger altered area not known. b. One identified vein of unknown size. Additional deposits may be present. c. One drainage with placer gold deposits. Additional deposits not likely because of small size of area and previous exploration. d. No known deposits but lodes may be present in source areas of placer gold.	a. n.a. b. n.a. c. n.a. d. n.a.	a. - b. - c. - d. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
12.	a. Au(Pt,U) - placer	b. Au -vein or disseminated lode c. U -disseminated or hydrothermal d. Pb,Zn -vein or replacement	Area of metavolcanic rocks - locally covered by basalt flows. a. Gold, with some platinium-group metals and uranium-bearing mineral disseminated locally in stream gravels. b. Nature of lode sources of placer gold not identified although there is one known gold-bearing vein. c. Presence of uranium-bearing minerals in stream gravels and spatial relation to area 11 suggests that lode uranium deposits may be present (see Additional Comments). d. Galena-, sphalerite-, and pyrite-bearing zone in meta-andesite; some antimony and gold.	a. Placer production: About 40% of the 2478 kg of gold and 85 kg of silver recorded from the Koyuk district was produced from this area, especially from deposits along Dime Creek. b. No data. c. No known deposits. c. No data.	Reconnaissance geologic mapping at 1:250,000 complete. Some reconnaissance geochemical surveys locally. Active placer gold mining locally. Exploration by industry for uranium.	Area lies adjacent to, and along structural strike with area 11. Plutonic rocks associated with lode uranium deposits in area 11 could extend into this area. If so, uranium-bearing accessory minerals may be disseminated in the plutonic rocks and/or uranium-bearing hydrothermally altered zones may be associated with them.	Area contains gold resources. Uranium and base-metal mineralization may be present. a. Placer gold deposits present in 9 separate drainages. Principal deposits probably identified but not exhausted. b. One identified gold-bearing vein. Source areas of placer gold probably contain additional deposits. c. Uranium-bearing minerals identified in 5 drainages heading in area 11. Deposits similar to those in area 11 may be present in this area. Potential cannot be evaluated with present information. d. One known deposit. Additional deposits may be present.	a. n.a. b. $\frac{90}{1}$ $\frac{50}{5}$ $\frac{10}{9}$ c. n.a. d. n.a.	a. - b. - c. - d. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
13.		a. Cu -massive sulfide associated with mafic volcanic rocks	Discontinuous northerly trending belt of mafic metavolcanic rocks. a. No known deposits of this type (pyrite- and chalcopyrite-bearing zones in, or associated with, mafic volcanic rocks) but one copper-bearing occurrence has been reported.	a. Samples containing up to 2400 g/t silver 1.7 g/t gold and undetermined copper were reported after prospecting in the Timber Creek area in 1907.	Reconnaissance geologic mapping at 1:250,000 but no additional information.	Belt is described as an ophiolite-like assemblage of mafic and, locally, ultramafic rocks. These rocks are considered permissible for the occurrence of volcanogenic massive sulfide deposits.	a. No known deposits. Potential cannot be evaluated with present information.	a. n. a.	a. If copper-bearing massive sulfide deposits are present, they may have grade and tonnage characteristics of the mafic volcanogenic model.

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
14.	a. Au -placer	b. Cu -lode deposits in carbonate rocks c. Pb,Zn -stratiform d. Au -vein or disseminated lode	Structurally complex area of metasedimentary rocks including marble. a. Gold locally disseminated in stream gravels. b. Sparse copper-carbonates and copper-sulfides in carbonate rocks known at one locality. c. No known deposits but presence of marble units requires that area be considered permissible for their occurrence (see Additional Comments). d. Nature of lode sources of placer gold not identified.	a. No data. b. No data. c. No known deposits. d. No known deposits.	Reconnaissance geologic mapping at 1:250,000 but no additional information.	Coal-bearing rocks present in southern part of area. Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contacts with marble--galena concentrations are present locally. Lack of identified large gold-bearing veins suggests that principal lode gold deposits are of disseminated type and possibly similar to those in areas 23 and 26.	Area contains some gold resources. Potential for lead, zinc, and copper resources cannot be evaluated with present information. a. Two small placer deposits identified. Potential for additional deposits unknown. b. One locality known. Potential cannot be evaluated with present information. c. No known deposits. Potential cannot be evaluated with present information. d. No known deposits but source areas of placer gold may contain some lode deposits.	a. n.a. b. n.a. c. n.a. d. n.a.	a. - b. - c. - d. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
15.		a. U -sedimentary	Restricted continental basin with unknown thickness of Cenozoic sedimentary materials. Basin surrounded by mountains that locally contain uraniferous rocks. a. No known deposits but geologic setting of basin indicates that uranium-bearing zones within sedimentary materials could be present.	a. No known deposits.	No geologic studies of basin or material within it.	Basin indicated by topography, structure, and gravity. Coal-bearing sedimentary rocks exposed near southern margin.	Area is permissible for sedimentary type uranium deposits because it is a restricted continental basin with source terranes that locally contain uraniferous rocks. a. No known deposits. Potential cannot be evaluated with present information.	a. n.a.	a. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
16.	a. Pb,Ag (Sb) - vein or replacement b. Mo(Pb,Zn) - porphyry? c. Pb,Zn(CaF_2) - vein, replacement, or stockwork d. Au -placer, vein, or disseminated lode	e. Pb,Zn -stratiform f. Sn(W) -vein, stockwork, greisen, tactite, or placer g. U -disseminated or hydrothermal lode h. Cu,Pb,Zn - contact-metamorphic	Area of medium - grade metasedimentary rocks, including marble, intruded locally by epizonal alkalic and granitic plutonic rocks. a. Argentiferous galena and locally stibnite vein or replacement bodies in carbonate rocks. b. Pyrite- and base-metal sulfide-bearing composite, epizonal, monzonitic stock with some molybdenite - cut by alkalic dikes. Molybdenite partly in tactite. c. Base-metal sulfides associated with quartz-fluorite vein stockwork in metamorphic rocks near altered epizonal intrusive rocks. d. Gold disseminated in some stream gravels. Gold- and silver-bearing sulfide impregnated schist with quartz veinlets identified at one locality. e. No known deposits of this type but presence of marble units requires that area be considered permissible for their occurrence (see Additional Comments).	a. Over 200 metric tons of hand-sorted lead-silver ore averaging 53% lead and 4800 g/t silver are reported to have been shipped from the Omilak mine. The Foster prospect averages 9.8% lead and 130 g/t silver in one area of 8 channel samples. This deposit contains galena nodules over 0.6 m in diameter, traces to 0.3% tin, some zinc, and from 7 to 14 g/t of silver per percent of lead. b. Grab samples from the Windy Creek pluton contain from 5 to 700 ppm molybdenum. The extent of the mineralization, which is also characterized by lead, zinc, and tin anomalies, has not been determined. c. Grab samples of quartz-fluorite rubble contains 500 ppm lead and 1000 ppm zinc. d. Quartz veinlet and schist material contains up to 1 g/t gold and 9.3 g/t silver. No data reported on gold placer. e. No known deposits.	Reconnaissance geologic mapping at 1:250,000 complete. Some more detailed geologic mapping in known mineralized areas. Geochemical surveys in northern part of the area. Active exploration by industry for Mo,Pb,Zn,Ag, and U.	Area of complex geology with a variety of known mineral deposits. Known stratiform lead-zinc deposits on Seward Peninsula(area 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contact with marble-- some galena concentrations locally. Thermally metamorphosed rocks are present in some areas, thus indicating buried plutons at depth. Such plutons may be similar to those exposed in the northern part of the area or to those in areas 17 and 18.	Area contains resources of lead, zinc, and silver and may contain important resources of tin, gold, uranium, and molybdenum. a. Identified deposits in three areas. Additional deposits probably present. b. One mineralized area identified. At least one additional area of similar hostrock suggested by aeromagnetic survey. Other areas may be present but not exposed. c. One mineralized area identified. Potential for additional areas cannot be evaluated with present information. d. One drainage with placer claims and one lode deposit identified. Additional deposits probably present.	a. n.a. b. n.a. c. n.a. d. n.a.	a. - b. If porphyry-type molybdenum deposits are present, they may have tonnage and grade characteristics of the porphyry molybdenum model. c. - d. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
16. (con't.)			f. Presence of placer cassiterite in some stream gravels, high tin concentrations in argentiferous galena deposits, and nature of some granite intrusions adjacent to area indicates that lode tin deposits may be present (see Additional Comments).	f. One stream sediment sample from Otter Creek is reported to contain 62 ppm tin. No identified deposits of other types.		Some granite intrusions in area 17 appear to be similar to those in area 1 associated with tin and related mineralization.	e. No known deposits. Potential cannot be evaluated with present information.	e. n.a.	e. -
							f. No known deposits. Potential cannot be evaluated with present information.	f. n.a.	f. -
			g. Plutonic rocks of the area may contain uranium-bearing accessory minerals or be associated with uranium-bearing hydrothermally altered zones (see Additional Comments).	g. No known deposits.			g. No known deposits. Potential cannot be evaluated with present information.	g. n.a.	g. -
			h. Sulfide-bearing tactite may be present adjacent to some plutons.	h. No known deposits.			h. No known deposits. Potential cannot be evaluated with present information.	h. n.a.	h. If copper-bearing skarns are present they may have tonnage and grade characteristics of the copper skarn model.

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
17.	a. U(Th) - disseminated	b. W -tactite, vein, or greisen c. U -secondary or hydrothermal d. Cu -vein, replacement, or tactite	Area contains large composite granite batholith that intrudes medium-to high-grade metasedimentary rocks. a. Granite batholith contains above average concentrations of uranium-- the uranium is present in accessory minerals and disseminated through the batholith. b. Local presence of scheelite, topaz, and fluorite in heavy mineral concentrates from streams draining this area suggests that lode tungsten mineralization is present. c. Uraniferous nature of granite, composite nature of granite batholith, evidence of hydrothermal alteration, and presence of euxenite-like mineral in heavy mineral concentrates from some streams draining this area suggest that secondary or hydrothermal-type uranium deposits may be present. d. Copper-carbonates and copper-sulfides occur in schist near granite at one locality.	a. Analyses of 13 samples from the granite batholith are summarized below (ppm): Mean / Range U 11.2 6.2-19.9 Th 58.7 40.8-83.8 Th/U 5.2 3.6- 8.9 The batholith outcrops over an area of approximately 500 km^2. b. No known deposits. c. No known deposits. d. No data.	Reconnaissance geologic mapping at 1:250,000, reconnaissance heavy mineral survey, and reconnaissance petrologic and geochemical study of batholith completed. Recent exploration by government and industry for uranium.	Granite batholith contains from two to three times reported average contents of uranium and thorium for granitic rocks and may be considered a low-grade uranium-thorium resource. Late-stage intrusions in the batholith appear lithologically similar to parts of granite complexes in area 1 that are associated with tin and related mineralization.	Area contains large, low-grade uranium and thorium resource. a. Granite batholith could be considered large, low-grade uranium-thorium resource. b. No known deposits but presence of scheelite in stream deposits suggests that some are present. c. No known deposits. Potential cannot be evaluated with present information. d. One occurrence identified but significance and potential for additional deposits cannot be evaluated.	a. n.a. b. n.a. c. n.a. d. n.a.	a. - b. If tungsten-bearing tactite deposits are present they may have tonnage and grade characteristics of the skarn/tactite tungsten model. c. - d. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
18.	a. U(Th,RE)-disseminated lode	b. U -secondary or hydrothermal	Area contains alkalic and related plutonic rocks that intrude low-grade metasedimentary rocks. a. Uranium-, thorium-, and rare-earth-bearing minerals are present in alkalic dikes. b. No known deposits of this type but plutonic rocks are similar to those in area 10 known to be associated with uranium-bearing hydrothermally altered zones.	a. Analyses of 12 samples of the pluton in the area are summarized below (ppm): Mean / Range U 5.8 2.0-12.5 Th 22.7 10.7-39.2 Th/U 4.5 2.8- 7.4 The pluton outcrops over an area of approximately 350 km^2. b. Samples at margins of alkaline dikes contain up to 0.15% U_3O_8, 1.05% ThO_2, and more than 2% rare-earth elements.	Reconnaissance geologic mapping at 1:250,000 complete. Reconnaissance heavy mineral survey in parts of area. Recent exploration by industry and government for uranium.	A poorly exposed area - only general geologic relations known.	Area contains resources of uranium. a. One uranium-thorium-rare-earth enriched dike set identified. Additional deposits probably present. b. No known deposits. Potential cannot be evaluated with present information.	a. n.a. b. n.a.	a. - b. -
19.		a. U -sedimentary	Restricted continental basin with thick (≥ 1 km) sedimentary deposits derived from adjacent highlands. Adjacent highlands contain uraniferous rocks locally. a. No known deposits but geologic setting of basin indicates that uranium-bearing zones within sedimentary materials could be present.	a. No known deposits.	No geologic studies of basin or materials within it. Reconnaissance gravity survey completed.	Basin is defined by topography, structure, and gravity. Coal-bearing sedimentary rocks have been identified locally.	a. No known deposits. On basis of geologic setting, this area is considered permissible for the occurrence of sedimentary-type uranium deposits.	a. n.a.	a. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
20.	a. Au -placer	b. Pb,Ag(Hg) - vein or replacement c. Au -vein or disseminated lode	Area contains low-grade calcareous schist and some carbonaceous metasedimentary rocks. a. Gold disseminated in gravels of two streams -- associated with carbonaceous metasedimentary rocks. b. Some lead, silver, and mercury production reported from one deposit - specific location and nature of this deposit has not been determined. c. Nature of lode sources of placer gold not identified.	a. Placer production: More than 300 kg of gold are reported to have been produced from Aggie Creek and Mystery Creek. b. Some flasks of mercury are reported to have been produced but there are no data on the reported lead and silver production. c. No known deposits.	Reconnaissance geologic mapping at 1:250,000 complete. No other geologic studies.	Structural relations indicate that large area of calcareous schist may overlie carbonaceous metasedimentary rocks. Throughout Seward Peninsula, gold, and in cases other deposits, are located in carbonaceous metasedimentary rocks but not in calcareous schist. Therefore, the calcareous schist unit could overlie deposits of gold and possibly other metals in this area. A placer gold deposit is present on Aggie Creek where carbonaceous metasedimentary rocks are exposed under calcareous schist.	Area contains some gold resources. a. Two drainages extensively placer mined but probably not exhausted. Potential for additional deposits limited. b. One reported occurrence. Significance and potential for additional deposits cannot be evaluated with present information. c. No known deposits but source areas of placer gold probably contain some lode deposits.	a. n.a. b. n.a. c. n.a.	a. - b. - c. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
21.		a. Pb,Zn -stratiform	Area contains limestone, marble, and other metasedimentary rocks. a. No known deposits. Area is considered permissible for occurrence of stratiform lead-zinc deposits because limestone and marble are present (see Additional Comments).	a. No known deposits.	Reconnaissance geologic mapping at 1:250,000 complete. No other geologic studies.	Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contacts with marble--some galena concentrations are present locally.	a. No known deposits. Potential cannot be evaluated with present information.	a. n.a.	a. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
22.	a. Au -placer	b. Au -vein or disseminated lode	Area of low-grade metavolcanic rocks and carbonaceous metasedimentary rocks. a. A few scattered gold deposits in stream gravels. b. Nature of lode sources of placer gold not identified (see Additional Comments).	a. A small amount of placer gold has been produced from deposits in this area. b. No known deposits.	Reconnaissance geologic mapping at 1:250,000 complete. No other geologic studies.	Area is adjacent to two important gold-bearing regions (area 23 and 24) but early prospecting has probably identified major placer gold concentrations. Lack of identified large gold-bearing veins suggests that principal lode gold deposits are of disseminated type and possibly similar to those present in areas 23 and 26.	Area contains minor resources of gold. a. Three small placer gold deposits identified. Presence of large placer gold deposits unlikely. Additional deposits probably few. b. Lode deposits are probably present in source areas of placer gold.	a. n.a. b. n.a.	a. - b. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
23.	a. Au -placer b. Au(W,Hg) - disseminated lodes	c. Pb,Zn - stratiform	Area of low-grade metasedimentary rocks including marble. a. Gold, accompanied by some cinnabar and scheelite, disseminated in stream and beach gravels. b. Gold-, cinnabar-, and scheelite-bearing arsenopyrite-and pyrite-impregnated schist cut by small mineralized quartz veins or veinlets. c. No known deposits of this type but presence of marble units requires that area be considered permissible for their occurrence (see Additional Comments).	a. About 900 kg of gold was produced from beach placers in the first year of mining. It is reported that 300 g/m^3 were produced over a 300 m distance. About 2800 kg of gold production was reported through 1965--most (about 95%) from Daniels Creek and beach. Estimates of gold contained in a 5 km^2 area offshore from Daniels Creek have been as high as 69,000 kg including 3,600 kg in first 200 m of seaward continuation of Daniels Creek channel. These estimates have not been tested. b. Small amounts of gold have been produced from disseminated lode deposits. Grades of 14 g/t gold over a width of 6 m and 0.5 g/t over widths of 60 to 150 m have been measured. Assays of small (about 2 m long) bodies of cinnabar ore range from 2.36 to 6.76% mercury. c. No known deposits.	Reconnaissance geologic mapping at 1:63,360 complete. Some detailed mapping and geochemical studies of mineralized zones. Recent exploration by industry for gold.	Placer gold deposits commonly localized by solution cavities in marble bedrock. Gold-bearing stream channel extends offshore. Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contacts with marble-some galena concentrations present locally.	Area contains important gold resources. a. Five separate drainages and present beach contain placer gold deposits. Offshore extension of stream channel known in one case and possible in others. Principal deposits identified but not exhausted. Additional deposits present in beach materials and offshore channels. Additional deposits may be present in solution cavities in marble. b. Three identified deposits. Additional deposits probably present in source areas of placer gold outside Daniels Creek drainage. c. No known deposits. Potential cannot be evaluated with present information.	a. $\frac{90}{2}$ $\frac{50}{5}$ $\frac{10}{8}$ b. $\frac{90}{3}$ $\frac{50}{5}$ $\frac{10}{7}$ c. n.a.	a. - b. - c. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
24.	a. Au -placer b. Au(Sb) -gold-quartz-stibnite veins or pods c. Au(Ag,W) - gold-quartz veins d. Cu -tabular replacement bodies	e. Au(W,Hg,Ag)-disseminated lodes f. Pb,Zn,Ag - stratiform, vein, or replacement	Large area containing northerly trending belts of carbonaceous metasedimentary rocks, metavolcanic rocks, and marble. a. Many deposits of gold disseminated in stream gravels. b. Discontinuous veins or boudinlike pods in schist that contain gold, stibnite, and quartz. c. Throughgoing quartz veins or veinlets, in carbonaceous metasedimentary rocks, that contain gold and some scheelite. d. Silicified zones containing some copper-carbonates and copper-sulfides; commonly localized at marble-schist contacts. e. Nature of lode sources of placer gold generally unknown. Residual placers and sulfide-impregnated schist present locally (see Additional Comments).	a. Probably between 90 and 95% of the 20,041 kg of gold and 111 kg of silver recorded for the Council district has been produced from this area. In addition, deposits in and along Solomon River probably account for 10% of the 138,158 kg of gold and 3,123 kg of silver reported from the Nome district. Deposits in the Iron Creek area probably account for about 10% of the 6,872 kg of gold and 300 kg of silver recorded for the Kougarok district. b. About 4 metric tons of antimony ore have been mined from one property. A stibnite lens up to 46 cm thick, in a 1.2 m thick quartz vein contained 63.7% antimony with no lead or zinc and only a trace of arsenic.	Reconnaissance geologic mapping at 1:250,000 complete. Reconnaissance geochemical surveys locally. Active placer gold mining locally.	Important placer gold deposits widely distributed. Lack of identified large gold-bearing veins (except for one locality) suggests that principal lode gold deposits are of disseminated type and possibly similar to those in area 23. Area containing important gold-bearing quartz veins (Big Hurrah) may be special case of disseminated-type. Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contact with marble- some galena concentrations are present locally.	Area contains important gold resources. a. Major placer gold-producing region. Placer deposits in about 40 different drainage systems including two major rivers. Deposits extensively mined but not exhausted. Additional deposits probably present in areas of deep bedrock. b. Two known deposits. Additional deposits may be present but potential cannot be evaluated with present information. c. Five known deposits or areas of mineralization. Additional deposits probably present.	a. n.a. b. n.a. c. n.a.	a. - b. - c. Some vein gold deposits may have tonnage and grade characteristics of the vein gold model.

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
24. (con't.)			f. One known deposit. Presence of marble belts requires that area be considered permissible for occurrence of stratiform lead-zinc deposits (see Additional Comments).	c. The Big Hurrah mine has produced about 806 kg of gold. Reserves have been estimated at 105,000 metric tons of ore at about 22 g/t of gold and 11 g/t of silver. About 50,000 metric tons of ore average 0.08 to 0.16% tungsten. Other gold-quartz veins include the Silver (Flynn) property, where a grab sample contained 75 g/t of gold, and along Crooked Creek, where from 2 to 70 g/t of gold has been reported in quartz veins or stringers. d. About 22 metric tons of ore with grades of from 17 to 36% copper, up to 62 g/t of gold, and from 11 to 180 g/t of silver have been shipped from the Wheeler mine on Sherrette Creek. Several additional tons of ore are reported to have been shipped from the Wheeler deposit southwest of Iron Creek.			d. Three known deposits and three additional deposits indicated by occurrence of copper-bearing minerals at or near marble-schist contacts. Additional deposits probably present. e. One deposit apparently identified and at least nine other deposits indicated by presence of residual gold placers. Additional deposits probably present. f. One deposit is strongly indicated. Additional deposits may be present but potential cannot be evaluated with present information.	d. 90/3 50/6 10/? e. 90/1 50/10 10/35 f. n.a.	d. - e. - f. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
24. (con't.)				e. Free gold has been panned from crushed samples of schist adjacent to quartz stringers in the Ophir Creek area. f. Two or three lenses of lead-silver ore with grades of 14 to 23% lead and 497 to 686 g/t silver were mined at the Wheeler property on Kruzgamepa River. The total ore mined was probably less than 10 metric tons.					

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
25.	a. Au -placer	b. Au -vein or disseminated lode	Area contains low-grade metavolcanic and metasedimentary rocks. a. A few scattered deposits of gold disseminated in stream gravels are present. b. Nature of lode sources of placer gold not identified (see Additional Comments).	a. Placer production: Almost 200 kg of gold are reported to have been produced by dredging on Beaver Creek. Dredging was also done on Pajara Creek. b. No known deposits.	Reconnaissance geologic mapping at 1:250,000 complete. Reconnaissance geologic mapping at 1:63,360 and geochemical surveys locally.	Area is adjacent to important gold producing regions(areas 24 and 26). Lack of identified large gold-bearing veins suggests that principal lode gold deposits are of disseminated type and possibly similar to those in areas 23 and 26.	Area contains some resources of gold. a. Three separate drainages with placer gold deposits. Additional deposits may be present in areas of deep bedrock but otherwise principal deposits were probably identified by early exploration. b. No known deposits but source areas of placer gold may contain some lode deposits.	a. n.a. b. n.a.	a. - b. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
26.	a. Au(W) - placer b. Au(W,Ag) - disseminated lodes c. Au(Sb) -gold-stibnite-quartz veins or pods d. Au -gold-quartz vein e. W -placer, vein, or stockwork f. Pb,Zn,(CaF_2) - stratiform g. Fe -gossan	h. Bi -vein i. Cu -tabular replacement bodies	Structurally complex area containing low-grade carbonaceous metasedimentary rocks, metavolcanic rocks, and marble. a. Many important deposits of gold disseminated in stream and beach gravels. b. Auriferous zones in schist that contain quartz veinlets, arsenopyrite, pyrite, and in cases, scheelite (see Additional Comments). c. Discontinuous veins or boudin-like pods in schist that contain gold, stibnite, and quartz. d. Throughgoing veins that contain gold, quartz, and some pyrite. e. Disseminated scheelite in stream gravels or residual placers associated with scheelite bearing quartz veins or stockworks in schist. f. Disseminated sphalerite and less abundant galena and pyrite in silicified schist at contact with marble. Fluorite and barite present locally.	a. About 90% of the 138,158 kg of gold and 3,123 kg of silver reported for the Nome district has been produced from this area. Gold production from Alaska Gold Company's dredging operations on Upper Dry Creek and at a beach deposit south of the Snake River increased from 242 kg in 1975 to 445 kg in 1976, with recovery between 0.42 and 0.49 g/m^3. The company estimates that over 37,000 kg of gold remain in the 5 km^2 of land to be worked. A deposit at Bonita Creek has been estimated to contain 1.1 to 1.5 million m^3 of material averaging 1.2 to 2.0 g/m^3 of gold and 190 g/m^3 of tungsten. All production data are for placer deposits.	Reconnaissance geologic mapping at 1:250,000 complete. Reconnaissance geologic mapping at 1:63,360 locally. Detailed studies of mineralized areas locally. Recent exploration for lead and zinc by industry. Active placer mining of scheelite and gold.	Major placer gold producing region of Seward Peninsula. Principal sources of placer gold are disseminated-type lode deposits. These deposits have not been adequately evaluated for their economic potential.	Area contains important resources of gold, lead, zinc and silver. Antimony, barite, fluorite, and tungsten resources are also present. a. At least 43 separate drainage systems and one large coastal area contain placer gold deposits. Additional placer deposits probably present in coastal area, in areas of deeper bedrock, and in areas covered by glacial drift. b. Principal source of placer gold. Many identified and indicated deposits within a 3 x 26 km north-northwest trending belt from Newton Gulch near Nome to vicinity of Mt. Distin. Additional deposits probably present in bedrock of coastal plain and in other areas of placer mining.	a. n.a. b. $\frac{90}{9}$ $\frac{50}{22}$ $\frac{10}{30}$	a. - b. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
26. (con't.)			g. Residual limonitic gossans in carbonate rocks. h. Bismuthinite-bearing quartz vein in schist. i. Silicified zones in carbonate rock containing copper-carbonate and copper-sulfide minerals.	b. A mill test of some quartz vein material at a prospect near Rock Creek recovered 22 g/t of gold, the owners reported higher grades in the adjoining schist. The extent and average grade of disseminated lode gold mineralization has not been determined. c. More than 180 metric tons of high-grade antimony ore have been produced from this area. d. At the McDuffee mine, from 53 to 91 metric tons of ore containing from 6 to 10 kg of gold, have been produced from quartz veins and lenses that also contain stibnite. e. About 13 metric tons of tungsten was contained in placer scheelite produced in this area. Some small veins near Rocky Mountain Creek contain about 2% tungsten. Scheelite float was traced for about 1200 m in this area. In 1951, 691 kg of concentrates containing 351 kg of tungsten were shipped from this area.			c. Several identified deposits--most in Mt. Distin area. Additional deposits probably present locally. d. A few identified small deposits. Additional deposits probably present in areas of placer deposits. e. A few small lode deposits known. Commonly present with gold in placer deposits and disseminated lode deposits. Additional deposits probably present in areas of known scheelite mineralization and principal placer mining areas. f. Recently identified deposit type. Additional deposits may be present in areas with marble.	c. 90/6 50/9 10/15 d. 90/4 50/5 10/9 e. 90/7 50/12 10/16 f. 90/5 50/8 10/13	c. - d. Some vein gold deposits may have tonnage and grade characteristics of the vein gold model. e. - f. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
26. (con't.)				f. Six samples of quartz-dolomite-sphalerite-galena replacement layers at the Aurora Creek deposit averaged 0.2% lead and 5.5% zinc. High-grade float contained up to 10% zinc and 0.3 g/t gold. g. Ore reserves have been estimated at 670,000 metric tons containing 10 to 45% iron. The Monarch property accounts for 84% of the total with six smaller properties contributing the remainder. h. No data i. High-grade samples have been assayed but extent and average grade of mineralization have not been determined.			g. Deposits identified and resources estimated--minor iron reserves present. h. One known deposit. A few additional deposits are probably present. i. Two deposits of unknown size. Additional deposits probably present.	g. 90/7 50/7 10/7 h. 90/1 50/5 10/7 i. 90/2 50/5 10/7	g. Estimated 670,000 metric tons containing 10 to 45% iron. h. - i. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
27.	a. Graphite-disseminated	b. CaF_2 -pipe or vein c. Cu,Mo -porphyry d. Cu,Pb,Zn (Ag,Au) -vein or replacement e. U -disseminated, secondary, or hydrothermal f. W -vein,stockwork,or tactite g. Mica -pegmatite	Medium-to high-grade metamorphic terrane intruded by numerous granitic bodies. a. Segregations and disseminations of graphite in schist. b. Fluorite pipe in metamorphic rocks known at one locality. c. Chalcopyrite and/or molybdenite-bearing intrusive rocks (see Additional Comments). d. Vein or replacement deposits that contain base-metal sulfides (see Additional Comments). e. Uranium-bearing minerals may be disseminated in intrusive or metamorphic rocks, present in hydrothermally altered zones, or present locally as secondary concentrations. f. Scheelite-bearing tactite, vein, or stockworks in schist. g. Mica-bearing pegmatite sills and dikes in metamorphic rocks.	a. Over 240 metric tons of flake graphite have been produced. In 1944, USGS reported 50 metric tons of sorted graphite, inferred reserves of 59,000 metric tons of 52% graphite, and 2 to 3 million metric tons of 10% graphite along a 5 km distance. b. No data. c. No known deposits. d. No data. e. No data. f. No data. g. Sheets of mica to 0.35 x 0.5 m have been found. Some production for local use.	Reconnaissance geologic mapping at 1:250,000 complete. Reconnaissance geochemical surveys in two areas. No additional geologic information. Some recent exploration by industry for uranium, tungsten, and base-metals. Area as a whole is poorly known.	A large mountainous area of complex igneous and metamorphic geology. Reconnaissance studies indicate presence of many sulfide-bearing altered zones. Base-metal molybdenum, tungsten, and silver mineralization is present. Uraniferous igneous and metaigneous rocks have recently been identified. Because region is poorly known most deposit types are listed in the "Suspected or Speculative" column. The geologic characteristics of this region require that it be considered permissible for the occurrence of these and possibly other types of deposits.	Area contains important graphite resources and may contain other resources. a. Area includes 5 km belt of graphite-bearing schist along north side of Kigluaik Mountains. Additional deposits are probably present. b. One identified deposit of unknown size in western part of area. Additional deposits may be present. c. No known deposits but presence of sulfide-bearing altered zones associated with granitic intrusive rocks and geochemical anomalies indicates that parts of the area are permissible for occurrence of these deposits.	a. n.a. b. n.a. c. n.a.	a. - b. - c. If porphyry-type copper and/or molybdenum deposits are present they may have tonnage and grade characteristics of the porphyry copper or the porphyry molybdenum model.

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
27. (con't.)							d. Several known mineralized zones, altered areas, and geochemical anomalies indicate that area is permissible for occurrence of base-metal sulfide-bearing vein or replacement deposits.	d. n.a.	d. -
							e. Uranium -and thorium-bearing igneous and meta-igneous rocks have recently been identified in the area. Number and types of deposits unknown.	e. n.a.	e. -
							f. Three small scheelite-bearing lodes are known. Additional deposits probably present.	f. n.a.	f. If tungsten-bearing tactite deposits are present they may have tonnage and grade characteristics of the skarn/tactite tungsten model.
							g. Several prospected deposits. Many additional pegmatite dikes and sills. Significance and potential cannot be evaluated with present information.	g. n.a.	g. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
28.	a. Au -placer	b. Au -vein or disseminated lode c. Pb,Zn - stratiform	Area contains low- to medium-grade metavolcanic rocks, carbonaceous metasedimentary rocks, and marble. a. Gold disseminated in stream gravels of two local areas. b. Nature of lode sources of placer gold not identified (see Additional Comments). c. No known deposits of this type but presence of marble units requires that area be considered permissible for their occurrence (see Additional Comments).	a. Small residual placer in Tomboy Creek is reported (1908) to have contained more than 4 g/m^3 of gold. b. No known deposits. c. No known deposits.	Reconnaissance geologic mapping at 1:250,000 complete. No other geologic studies.	Area lies between known mineralized areas 26 and 29 but contains only three known gold placers. Area has been partly glaciated and some placers could have been derived from moraines whose source regions were in other areas. Known stratiform lead-zinc deposits on Seward Peninsula (areas 6 and 26) contain disseminated sphalerite and less abundant galena in silicified schist at contact with marble--some galena concentrations are present locally.	a. Area contains three small gold placers in two different areas. Potential for additional deposits cannot be evaluated. b. If known placer gold deposits are related to local bedrock sources, then two to three lode deposits are indicated in the area. c. No known deposits. Area is permissible for occurrence of stratiform lead-zinc deposits because it contains marble-schist units and is adjacent to parts of area 26 that are known to contain these deposits.	a. n.a. b. $\frac{90}{0}$ $\frac{50}{2}$ $\frac{10}{3}$ c. n.a.	a. - b. - c. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3
29.	a. Au(W,Hg)-placer	b. Au(W,Hg,Ag) - vein or disseminated lode	Area of low-grade metavolcanic and carbonaceous metasedimentary rocks. a. Gold, locally with cinnabar and scheelite, disseminated in stream gravels. b. Nature of lode sources of placer gold not identified (see Additional Comments).	a. Placer production: About 90 percent of the 1540 kg of gold and 68 kg of silver from the Port Clarence district was produced in this area; the largest producers were Gold Run and Sunset Creeks. b. No data.	Reconnaissance geologic mapping at 1:250,000 complete. Reconnaissance geochemical survey complete for most of southern part of area. Some recent placer gold mining.	Lack of identified large gold-bearing veins suggests that principal lode gold deposits are of disseminated type and possibly similar to those present in areas 23 and 26.	a. Area contains at least 13 separate stream drainages with placer gold deposits. Major placer deposits are identified, extensively mined, but not exhausted. b. Three identified lode gold deposits of unknown type. Several unidentified deposits are probably present.	a. n.a. b. $\frac{90}{3}$ $\frac{50}{15}$ $\frac{10}{17}$	a. - b. -
30.		a. U -sedimentary	Restricted continental basin with unknown thickness of Cenozoic sedimentary materials, flanked to south by fault-bounded mountain range containing some uraniferous rocks. a. No known deposits but geologic setting of basin indicates that uranium-bearing zones within sedimentary materials could be present.	a. No known deposits.	No geologic studies of basin or materials within it.	Basin indicated by topography, structure, and gravity.	a. Area is permissible for the occurrence of sedimentary-type uranium deposits because it is a restricted continental basin with source terranes that locally contain uraniferous rocks. Potential cannot be evaluated with present information.	a. n.a.	a. -

AREA OUTLINED ON MAP	TYPES OF KNOWN DEPOSITS	SUSPECTED OR SPECULATIVE TYPES OF DEPOSITS (INCLUDES MINOR OCCURRENCES)	GEOLOGIC CONTROL(S) OF MINERAL RESOURCES	PRODUCTION AND RESOURCE INFORMATION	STATUS OF GEOLOGIC INFORMATION	ADDITIONAL COMMENTS	SUMMARY OF MINERAL RESOURCE POTENTIAL	ESTIMATED NUMBER OF DEPOSITS; PERCENT CHANCE THAT THERE ARE THE NUMBER PREDICTED OR MORE	GRADE AND TONNAGE MODELS FOR DEPOSIT TYPES (DATA LISTED IN TABLE 3)
31.		a. U- sedimentary	Restricted continental basin with unknown thickness of Cenozoic sedimentary materials, flanked to south by mountain range containing some uraniferous rocks. a. No known deposits but geologic setting of basin indicates that uranium-bearing zones within sedimentary materials could be present.	a. No known deposits.	Surface geology known in some detail but no specific studies of basin or materials within it.	Basin indicated by topography and gravity. Coal-bearing sedimentary rocks exposed near northern margin.	a. Area is permissible for the occurrence of sedimentary-type uranium deposits because it is a restricted continental basin with source terranes that locally contain uraniferous rocks. Potential cannot be evaluated with present information.	a. n.a.	a. -

GRADE AND TONNAGE MODEL DATA

A specified deposit type can be characterized as having a restricted range of size, which, if known, can be used in conjunction with an estimate of the number of occurrences of deposits of this type to produce a resource estimate. This estimate describes the amount of the commodity or commodities contained in deposits of the specific type that may occur in a specific area. The range of size of a particular deposit type may be considered as the range of tons of metal contained in deposits of that type. More information is provided by examining the range of tons of ore and the range of ore grade of deposits. For instance, 100,000 metric tons of copper might be distributed in 100 million tons of ore (a grade of 0.1 percent copper) or in 10 million metric tons of ore (a grade of 1.0 percent copper).

Information about the size of some different mineral deposit types has been prepared for use in mineral resource assessment studies of Alaska and summaries of distributions of ore tonnage and ore grade for these deposit types are presented in table 3. The collection and analysis of data used to construct the statistical sample for each deposit type follows the procedure used by Singer, Cox, and Drew (1975) in their analysis of different types of copper deposits. The data used to prepare table 3 are from mineral deposits around the world that belong to one of the deposit types studied and that have available grade and tonnage estimates, derived, where possible, by combining estimates of past production and present resources. For some deposit types, the information available permitted the estimation of range of contained metal, but not ore grade and ore tonnage. The summary statistics in

table 3 show the median value of the tonnage, grade, or contained metal of a particular deposit type (column 6) and the range within which 80 percent of the deposits are expected to be (range is between values given in columns 5 and 7). For instance, 80 percent of porphyry copper deposits are expected to contain 20 to 430 million metric tons of ore, 10 percent are expected to contain more than the upper limit, and 10 percent are expected to contain less that the lower limit. These suppositions are based upon the observation that the and tonnage can be characterized by a lognormal statistical distribution. A more complete description of this type of analysis is contained in Singer, Cox, and Drew (1975).

Only a few of the grade and tonnage models of table 3 have been referenced in the description of mineral resource potential areas in table 2. This is because not all of the deposit types modeled have analogs on Seward Peninsula. In addition, many of the deposit types listed in columns 2 and 3 of table 2 are not represented in table 3 because information on the size of these deposit types was insufficient for statistical analysis.

TABLE 3. GRADE AND TONNAGE MODELS

[Related data occur on line from column to column; all data in metric units; NS, not significant; *, significant at 5-percent level; **, significant at 1 percent level]

Deposit Type	Tonnage and grade variables (units in parenthesis)	Number of deposits used in developing model	Correlation coefficient of listed variable with variable on line with it in column 2	90 percent of deposits have at least	50 percent of deposits have at least	10 percent of deposits have at least
Porphyry Copper	Tonnage of ore (millions of tons)	41		20	100	430
	Average copper grade (percent)	41	with tonnage of ore = -0.07 NS	0.1	0.3	0.55
	Average molybdenum grade (percent Mo)	41		0.0	0.008	0.031
Island Arc Porphyry Copper	Tonnage of ore (millions of tons)	41		20	100	430
	Average copper grade (percent)	41	with tonnage of ore = -0.07 NS	0.1	0.3	0.55
	Average molybdenum grade (percent Mo)	41		0.0	0.008	0.031
	Average gold grade-locally significant but not determined					
Porphyry Molybdenum	Tonnage of ore (millions of tons)	31		1.6	24	340
	Average molybdenum grade (percent Mo)	31	with tonnage of ore = -0.05 NS	0.065	0.13	0.26
Podiform Chromite	Tonnage of Cr_2O_3 (tons)	268		15	200	2,700
Copper Skarn	Tonnage of ore (millions of tons)	38		0.08	1.4	24
	Average copper grade (percent)	38	with tonnage of ore = -0.44**	0.86	1.7	3.5
	Average gold grade, locally significant, but not determined					
Mafic Volcanogenic	Tonnage of ore (millions of tons)	37		0.24	2.3	22.0
	Average copper grade (percent)	37	with tonnage of ore = -0.13 NS	1.1	2.2	4.1
	Average zinc grade excluding deposits without reported grades (percent)	19	with tonnage of ore = 0.03 NS	0.3	1.3	5.5
	Average gold grade-locally significant but not determined					
Felsic and Intermediate Volcanogenic Massive Sulfide	Tonnage of ore (millions of tons)	89		0.19	1.9	18.0
	Average copper grade (percent)	89	with tonnage of ore = -0.41**	0.54	1.70	5.40
	Average zinc grade excluding deposits without reported grades (percent)	41	with tonnage of ore = 0.25 NS	1.40	3.80	10.08
	Average lead grade excluding deposits without reported grades (percent)	14	with tonnage of ore = -0.02 NS	0.20	0.95	4.80
	Tonnage contained gold excluding deposits without reported gold (tons)	38	with tonnage of ore = 0.78**	0.27	2.90	32.00
	Tonnage contained silver excluding deposits without reported silver (tons)	46	with tonnage of ore = 0.82**	5.00	80.00	1300.00
Nickel Sulfide	Tonnage of ore (millions of tons)	48		0.23	1.20	5.90
	Average nickel grade (percent)	48	with tonnage of ore = -0.03 NS	0.32	0.61	1.20
	Average copper grade (percent)	48	with tonnage of ore = 0.03 NS with nickel grade = 0.04 NS	0.18	0.47	1.20
Mercury	Tonnage of contained mercury (tons)	165		0.09	3.10	120.00
Vein Gold	Tonnage of contained gold (tons)	43		0.29	3.30	38.00
Skarn/Tactite Tungsten	Tonnage of ore (millions of tons)	31		0.024	0.63	17
	Average tungsten grade (percent W)	31	with tonnage of ore = -0.34 NS	0.24	0.51	1.10

SUMMARY AND CONCLUSIONS

The summary of geologic and mineral resource information of Seward Peninsula presented in this report provides a basis for some qualitative or quantitative estimates of mineral resource potential. The information upon which these estimates rely is complete and up-to-date so far as existing knowledge is concerned but the nature and extent of previous geologic and mineral deposit studies on Seward Peninsula has left large parts of the region essentially unexplored for mineral deposits and poorly known geologically.

This study has identified and evaluated areas where undiscovered resources may be present. Because available information about most of these areas is limited in scope and detail many conclusions regarding mineral resource potential can only be qualitative in nature and, in most cases, the ranking of potential of one area relative to another is precluded by the level of information as well as the need to establish the relative importance of different mineral commodities. This study should be considered a preliminary assessment of Seward Peninsula mineral endowment and future assessments, based upon more comnprehensive information can be expected to be more definitive and accurate. One important finding has been the identification of the inadequacies of the available information, in detail, scope, and by geographic area, for resource assessment. However, some important general conclusions concerning Seward Peninsula mineral endowment in regard to gold, tin, beryllium-fluorite, graphite, lead-zinc-silver, copper and copper-iron, and uranium resources can be made and these are listed and discussed separately below.

1. Gold- Recorded gold production from Seward Peninsula is about 196,000 kg (6.3 million troy ounces)

essentially all of this is from placer deposits. About 37,000 kg of reserves have recently been identified in placer deposits being dredged. Taking into consideration the recovery efficiency of previous placer mining and the presence of undiscovered or unworked deposits, placer gold resources are concluded to be at least half that previously produced and could easily be more. A large part of these resources are in areas 26 and 24 which have accounted for over 80 percent of Seward Peninsula placer gold production.

This study has concluded that lode gold deposits of disseminated type are the principal sources of placer gold and that these deposits are known or strongly suspected in every major gold-producing area of the peninsula. They have been identified in three map areas and are suspected in 17 other map areas. Previous workers have examined these deposits from the perspective of low-grade, large tonnage resources only in map area 23. The known and undiscovered deposits of this type could easily contain several times the amount of gold recorded from Seward Peninsula placer deposits.

Total Seward Peninsula gold resources are therefore concluded to be at least equivalent to past production and could be many times this amount. Parts of these resources are present in every major gold-producing area of Seward Peninsula.

2. Tin- Seward Peninsula has produced over 2000 metric tons of tin from placer and lode deposits and contains about 40 percent of the nation's identified tin resources (about 33,000 metric tons of tin). Almost all of the identified tin resources of Seward Peninsula are present in one mineralized zone of the Lost River area (in map area 1). Because several other mineralized zones are present at this and at least eight other localities, Seward Peninsula as a whole probably contains several times the amount of tin resources presently known. Judging from the extent and nature of related mineralization, most of the undiscovered tin resources may be present in the Lost River area alone.

3. Beryllium-fluorite- Major beryllium-bearing fluorite deposits have been identified and drilled in the Lost River area (in map area 1). The Lost River area has been estimated to contain about 1.8 million

metric tons of material that contain 0.18 to 0.29 percent beryllium and 50 percent fluorite. Because of additional known and undiscovered deposits in this area, total beryllium-fluorite resources are significantly greater than those presently quantifiable.

4. Graphite- Over 240 metric tons of flake graphite have been produced from deposits along the north side of Kigluaik Mountains. Preliminary estimates of resources total about 300,000 metric tons of graphite contained in about 3 million metric tons of hostrock. Because schist containing disseminated and segregated graphite forms a belt about 5 km long, the total graphite resources of this area may be considerably more than are presently known.

5. Lead-zinc-silver- Several different types of deposits containing lead, zinc, and silver occur on Seward Peninsula. The different types are expected to be of different ages, origins, sizes, grades, potential byproducts, and geologic controls. Deposits of these types have not been adequately studied and their geologic controls are poorly understood. Because lead-zinc-silver-bearing deposits play a major role in defining several large mineral resource potential areas on Seward Peninsula and because data needed to evaluate the potential of these areas are generally not available, these deposits warrant much more study.

6. Copper and copper-iron Copper-bearing deposits on Seward Peninsula are also of several different types. Tabular replacement bodies located in or adjacent to carbonate rocks have been the sole producer of copper to date but these deposits have been interpreted (Sainsbury, 1975, p. 90-94) to represent only minor resource concentrations. They have only been studied in the near surface (generally oxidized) zone, and may warrant further study.

Copper-bearing deposits with more clearly defined geologic relations are those developed in contact-metamorphic zones surrounding granitic plutons--especially the newly discovered chalcopyrite-bearing magnetite deposits of the Kugruk River area. This and other types of contact-metamorphic deposits are the principal reasons that large parts of eastern Seward Peninsula have been identified as having resource potential for copper. These

areas need further study before their significance for either iron or copper resources can be evaluated.

7. Uranium- Large parts of Seward Peninsula have been identified as having potential for uranium deposits and many private companies have conducted recent exploration for these deposits. Although the potential for uranium resource cannot yet be quantifiably evaluated, government and industry studies to date indicate that areas intruded by alkaline and related granitic rocks in eastern Seward Peninsula contain at least some uranium-bearing deposits and that the Darby batholith represents a very-low grade uranium resource.

The potential for uranium-bearing deposits in granite complexes of northwestern Seward Peninsula and in sedimentary deposits of four restricted continental basins (map areas 15, 19, 30, and 31) cannot be evaluated at present. The potential for sedimentary-type uranium deposits may be greater in the basin of map area 19 than in the other basins because of its greater thickness of sedimentary deposits and more clearly defined relations to adjacent source terranes.

In general conclusion, Seward Peninsula contains large amounts of gold, tin, beryllium, fluorite, and graphite resources and some antimony, tungsten, lead, zinc, silver, iron, copper, and uranium resources. All of the latter resources are probably present in amounts significantly greater than presently known. In addition to the above resources, bismuth, mercury, arsenic, cadmium, molybdenum, platinum-group elements, rare-earth elements, and thorium resources are present but these would mostly be produced as byproducts in the mining of other resources.

REFERENCES

Unless specifically cited in this report, the reference list does not include papers previously cited in components of the report series that was prepared as a foundation for this study (table 1). This list does include many papers that provided information in the final stages of this study, but were not cited specifically within this or other reports of the accompanying series.

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